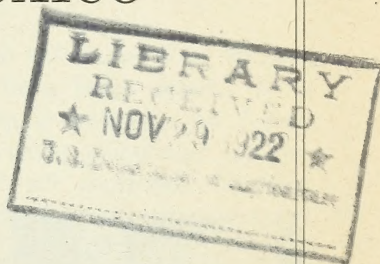


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The National Forests of New Mexico



UNITED STATES
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THE NATIONAL FORESTS OF NEW MEXICO.

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INTRODUCTION.

BY MANY who are not acquainted with the State, New Mexico, the land of sunshine, is thought to be a large desert. As a matter of fact, nearly one-fifth of its area is covered with forest. To be sure, more than half the forested part is piñon and juniper, and these, because they grow on arid soil, are composed of short,



Fig. 1.—Western yellow pine, the most important saw-timber tree of New Mexico.

limby trees of no value as saw timber. The stands are, however, located near the more densely settled sections of the State and for that reason are extensively used for fuel, fence posts, and mine props. The forests that yield saw timber cover about $5\frac{1}{4}$ million acres and are restricted to the mountains where rainfall is more abundant than at the lower elevations. (Fig. 1.)

Even before New Mexico became a part of the United States, large areas of its forests had passed into private hands through grants by the Spanish Crown and the Mexican Government. Most of these grants were later confirmed by our own Congress. Except where homesteaders settled or where claims were taken up under the timber and stone act or other acts of Congress, the remainder of these forest areas continued in the public domain. From those private lands that were accessible the timber was stripped with no thought of a future supply (Fig. 2); and because grazing was unregulated on the public domain, competition there resulted in the overgrazing of the most desirable areas.



FIG. 2.—Heavy slash left after clear cutting on private land, with no provision for growing more timber. The cut-over area is a real fire trap. Contrast with regulated cutting on National Forest (Fig. 3).

These conditions were not peculiar to New Mexico; they were found throughout the West. In California and the Northwest great bodies of timber were being destroyed by fire and by destructive logging. Congress finally recognized the need for protecting from destruction the remaining timber on the public domain and for insuring a regular flow of water in the streams that rise in those regions. Therefore, in 1891, Congress authorized the President to set aside forest reserves and the first one was created by President Harrison. Later these reserves came to be known as National Forests, and they are now administered by the Forest Service, a bureau of the Department of Agriculture.

There are now six National Forests in New Mexico. They comprise a gross area of approximately $9\frac{1}{2}$ million acres, not counting the Coronado National Forest, a small part of which is in New Mexico and the remainder in Arizona. These six Forests bear a timber stand of 15,000,000,000 board feet of saw timber and other forest products. They provide a permanent lumber industry for that region; they supply material needed in the development of ranches, farms, and cities; they add stability to the live-stock industry. They also promote the development of facilities for transportation and communication on the forest areas. Furthermore, by means of the

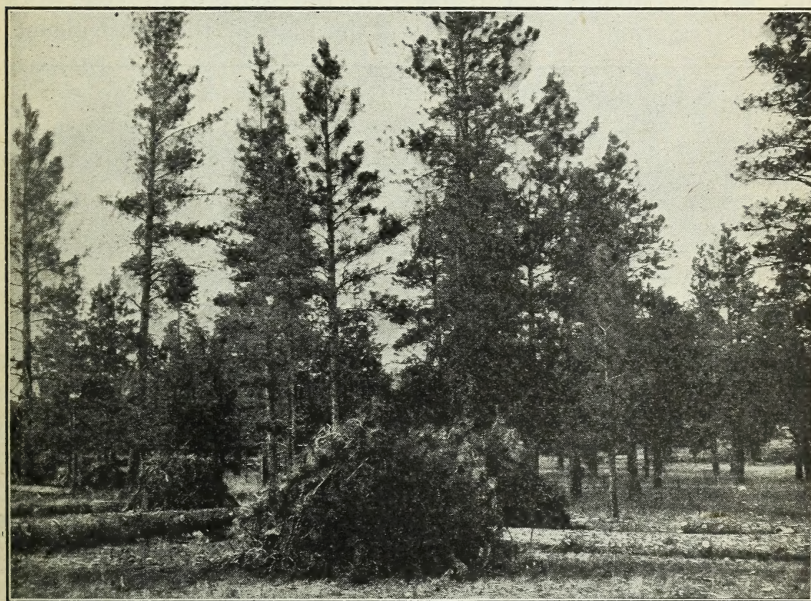


FIG. 3.—Under Forest Service regulations the lumberman leaves the young thrifty trees for future growth and some older trees to furnish seed. Brush is lopped and scattered or piled and burned. Brush piles shown are to be burned.

receipts derived from their administration, they contribute to the road and school funds of the counties in which they are situated. Mining, agriculture, grazing, and all other uses of the forest areas not incompatible with their primary purpose are encouraged.

The New Mexico National Forests, under forest management, are estimated to have a present annual productive capacity of about 80,000,000 board feet of lumber, sufficient to build each year 8,000 homes for the people of New Mexico. With the development of better methods of forest management, a considerable increase in the annual production may be confidently expected. (Fig. 3.) The production of a continuous timber supply through the practice of

forestry on the national forests will add stability to the lumber industry and this in turn will aid the prosperity of the State.

The location of the New Mexico National Forests on the watersheds of the most important streams of the State has a marked effect upon the prosperity of its irrigated valleys. Much of the water for the important Elephant Butte, Carlsbad, Rio Hondo, and Eagles Nest projects comes from the National Forests and most irrigated farms on smaller streams are entirely dependent upon waters from these watersheds. Denuding these Forests of their timber and grass would be followed by a rapid run-off of the fallen water, and this would result in floods and the silting of the reservoirs used for irrigation. (Fig. 4.) It is the plan of the Government,

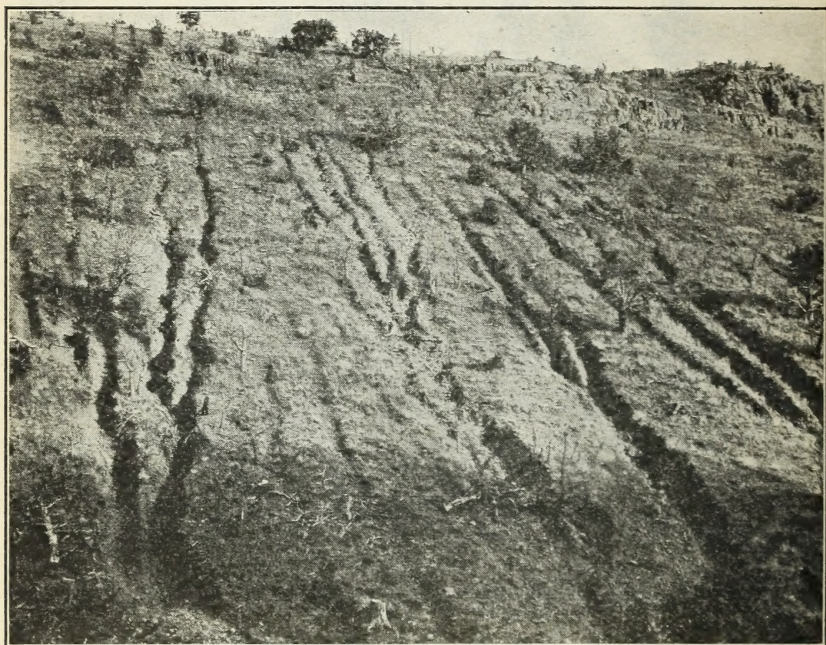


FIG. 4.—Deforestation and over-grazing cause erosion with resultant floods and silting of irrigation reservoirs. National Forest control prevents this.

therefore, not only to keep the Forests continuously productive and to handle their timber and other resources for the benefit of the people, but also to care for the irrigation interests of the State.

Because fire is the greatest enemy of the forests of New Mexico it is also the greatest enemy of the timber and water supply. Before the National Forests were created, forest fires annually destroyed millions of feet of timber in the State. Now, however, with a system of lookout towers, telephone lines, and trails, the forest rangers are enabled to detect and reach fires very quickly. Consequently over 80 per cent of these fires are extinguished before they

have covered 10 acres. In spite of the fire protection organization of the Forest Service, however, there is an average of nearly 200 fires each year on the National Forests of New Mexico. These fires burn over about 12,500 acres annually and damage the timber and grazing

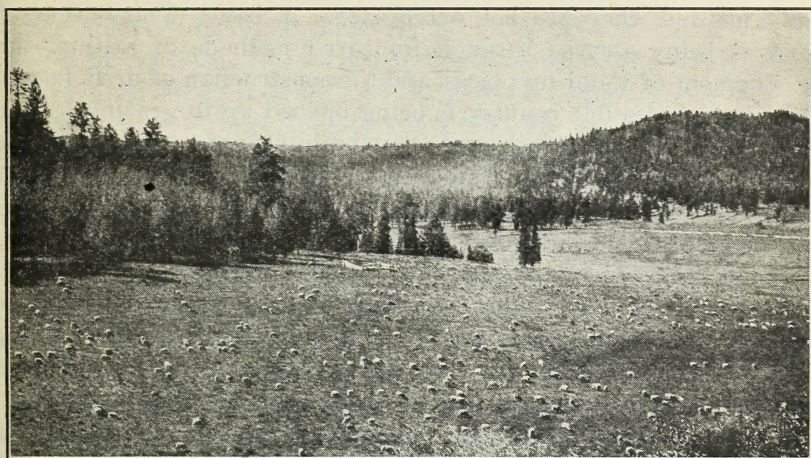


FIG. 5.—About 428,000 sheep and goats graze on New Mexico's National Forests.

resources to the amount of \$8,000. One-third of these fires are started by lightning and are unavoidable; but, as two-thirds of them are the result of the carelessness of man, there is an excellent opportunity for reducing the annual loss, provided extreme care with fires is exercised by all users of the Forests.

The Forest ranges of New Mexico are a large factor in the livestock industry of the State. About 178,000 head of cattle and horses

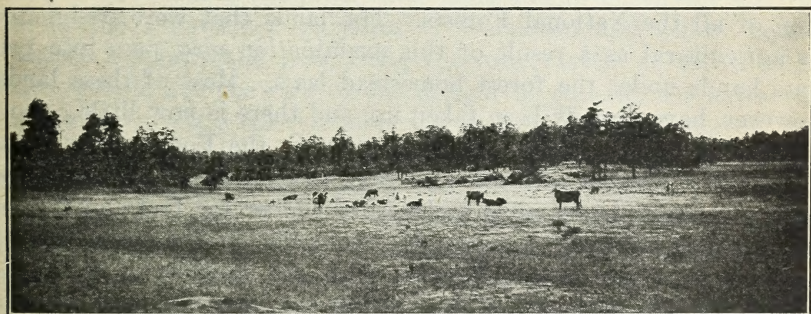


FIG. 6.—High mountain summer range. The National Forests of New Mexico provide range for about 178,000 cattle and horses.

and 428,000 head of sheep and goats, are grazed annually on the National Forests within its borders. (Figs. 5 and 6.) The purpose of the grazing regulations of the Forest Service is to produce an equitable distribution of grazing privileges and a permanent grazing industry. In the application of these regulations the interests of the small

stockmen are amply protected. Sound principles of range management, the result of many years of intensive study, are being put into effect on the National Forests. The carrying capacity of the different ranges is being closely approximated; although the ranges are fully utilized, they are not overgrazed. A better distribution of stock is being secured through improved methods of salting, the development of watering places, and the construction of drift fences. Hitherto inaccessible country is being opened up to grazing by the construction of stock trails and other improvements, and ranges are being used by the kind of stock best suited to them. The forest ranges are improving under this system, and their regulated use will not interfere with the production of future crops of timber.

Prospecting for minerals on the National Forests may be carried on under the Federal mining laws with no more restrictions than on the public domain. The same thing is true about the establishing of mining claims after the discovery of ore. A number of New Mexico's largest mines are located on or near the National Forests and are dependent upon them for timbers, lumber, and fuel. The use of forest resources for the development of local industries is especially encouraged and applications for the sale of timber for local consumption are given a preference over those for the general market.

It has been the policy of the Department of Agriculture to encourage the homesteading of any agricultural lands within the forests, and consequently many persons live upon and cultivate homesteads therein. In order to segregate these lands from the strictly forest lands, the Government several years ago completed a classification of all the National Forests. The lands that were designated as agricultural as a result of this examination may pass into private hands under the forest homestead laws. Most of these lands, however, have already been taken up, and there is now little opportunity for homesteading. Homesteaders on the Forests may graze a restricted number of work and milk stock free. They may also obtain without charge certain classes of timber for fuel and for the development of their homesteads. In addition they are allowed grazing privileges commensurable with the number of stock the homestead will support for the time of the year the stock are not on the National Forest.

The Forest Service is rapidly improving transportation and communication facilities on the New Mexico National Forests. It has built 1,347 miles of telephone lines, 200 miles of roads, and 1,450 miles of trails to promote the administration and protection of the forest areas. The annual receipts from the New Mexico National Forests are about \$300,000, and of this amount 25 per cent, or \$75,000,

is turned into the county funds for the roads and schools. Ten per cent of the total receipts have been by law made available to the Forest Service for use in constructing additional roads and trails, and this fund now amounts to about \$30,000 per year. As the receipts steadily increase, these funds which accrue directly to the benefit of the State, will correspondingly increase from year to year.

The National Forests of New Mexico offer great business opportunities to lumbermen and stockmen who are seeking locations for their business. As the general development of the State takes place, new bodies of timber are becoming marketable, and about these the Forest Service furnishes information to prospective purchasers. On some of the New Mexico National Forests there are still areas of excellent summer range for the use of which the Forest Service can issue grazing permits to settlers who meet the requirements of the regulations governing the allotment of grazing privileges.

In addition to their economic resources, the New Mexico National Forests have a large and increasing value in the attractions they offer to travelers, sportsmen, and health seekers and in their increasing popularity with the people of New Mexico and adjacent States for purposes of recreation. The value of the Forests for travel, sport, and other recreation is largely dependent on a proper preservation of their scenic beauty, on the development of roads and trails to make them accessible to the public, on the protection of their historical and archæological monuments and ruins, and on the conservation of their fish and game. It is the definite policy of the Forest Service to accomplish these ends and to encourage the full use of the Forests for purposes of recreation and public health. Because the railroads pass along the lower levels of the country, many people are unaware of the delightful climate, the extraordinary scenery, the wealth of historical and archæological interest, and the facilities for sport, rest, and recreation which are offered to them in the mountains of New Mexico. (Fig. 7.)

Persons who may wish to construct summer homes may receive long-term permits to build upon small but attractive locations in the National Forests. These permits are issued at reasonable annual charges. Those, however, who desire merely to camp in the Forests may do so without charge or restriction. They are required only to be careful with fires and to leave clean camp grounds upon their departure. In some localities public camp grounds with fireplaces and other facilities have been set aside for their convenience. There will doubtless be a growing appreciation of the possibilities of the New Mexico National Forests as a summer playground. With the steady development of their economic resources, they will contribute an increasing share to the well-being and prosperity of the State.

The National Forests of New Mexico are under the supervision of the district forester, whose headquarters is at Albuquerque. (Fig. 8.) The administration of each Forest is in the hands of a forest supervisor under whom a number of forest rangers are em-



FIG. 7.—Among the pines and the spruces of New Mexico's National Forests, thousands of campers each summer find relief from the heat of the surrounding valleys. Permits may be obtained to erect summer homes on the Forests.

ployed. To persons who may desire it, supervisors will be glad to give detailed information about their respective Forests.

THE CARSON NATIONAL FOREST.

(In Rio Arriba and Taos Counties.)

Situated in the extreme north-central part of New Mexico and embracing a gross area of 925,301 acres, the Carson National Forest more closely resembles the mountainous regions of Colorado than the topography of New Mexico and Arizona. The Forest area lies in four divisions, known as the Amarilla, Taos, Picuris, and Jicarilla divisions, and the administrative headquarters is at the historical town of Taos, once the home of the famous scout and pioneer, Kit Carson, after whom the Forest is named.

The Carson National Forest is an area of large economic importance and of intense and varied interest. Its comparatively ample rainfall and heavy winter snows give rise to many streams, which form a part of the headwaters of the Rio Grande and San Juan Rivers, and its watersheds accordingly bear an important rela-



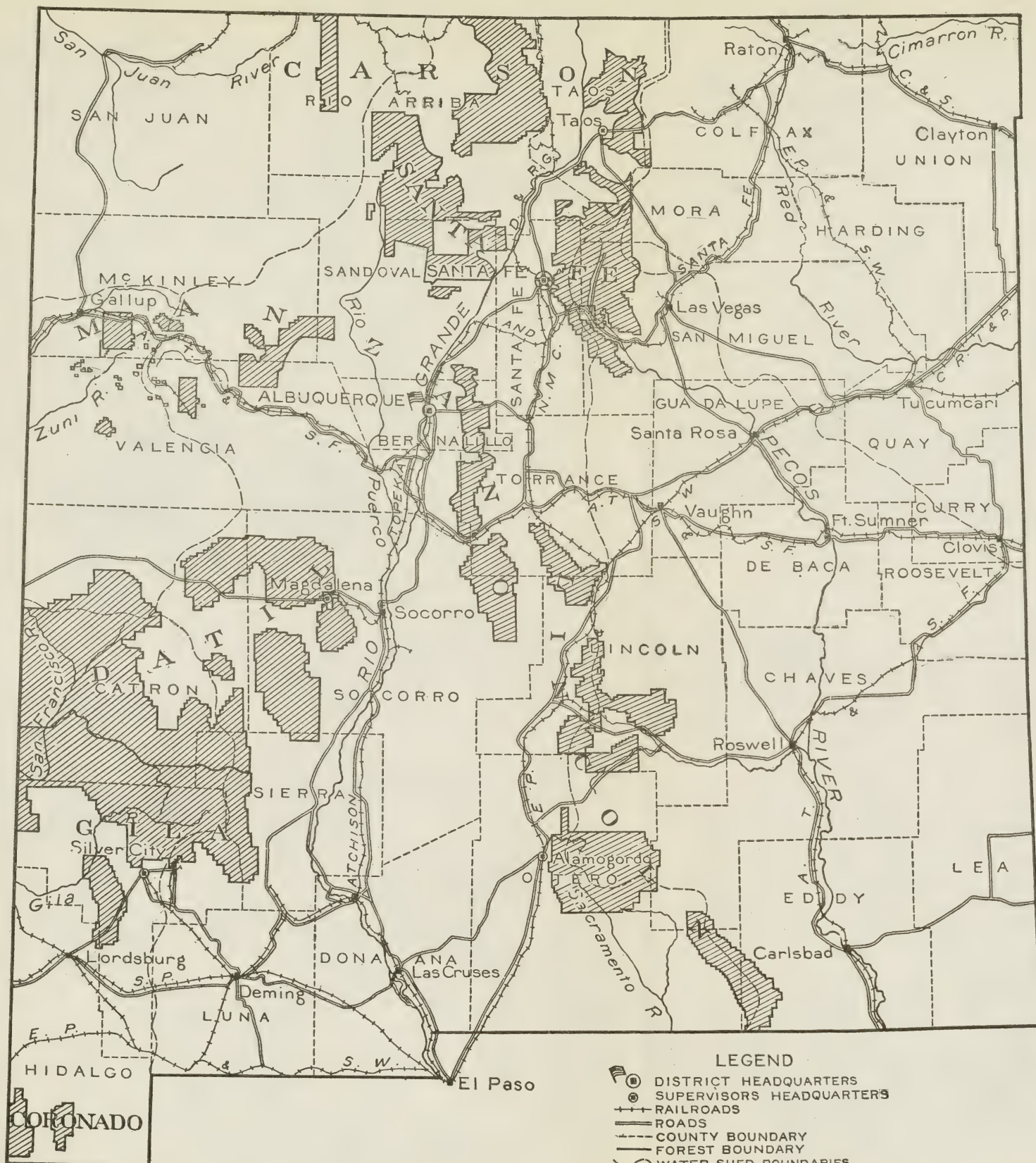


FIG. 8.—National Forests of New Mexico.

tion to the agricultural communities whose water supply is dependent upon those two streams.

The timber resources of this Forest are also of considerable magnitude, the total stand being estimated at 1,017,000,000 board feet of saw timber and 968,000 cords of wood. Of this amount 11,063,000 board feet of lumber, railroad ties, and other forest products were cut in the fiscal year 1921. These timber resources now supply 14 active sawmills with the material for their operation. Among these is one of the largest sawmills of the Southwest, which is operated in connection with 35 miles of especially constructed railway lines.

The extensive grazing resources of the Carson Forest are becoming fully utilized by the large population of the numerous small towns included within and adjacent to the forest boundary. There were 687 grazing permittees who used range on this forest during the calendar year 1921. Permits were issued for that year for a total of 10,889 cattle and horses and 155,935 sheep and goats. In addition several thousand milk and work animals were grazed free of charge on the forest ranges by local settlers. The country in and near the Carson National Forest is one of the oldest settled regions in the United States; and although it has been used for grazing for hundreds of years there is every indication that under the administration of the Forest Service the forest area will continue to support as many head of stock as are now permitted, or even more. There are a few small unused areas consisting of rough mountain range suitable for the summer grazing of cattle, which offer opportunities for settlers desiring to enter the stock business.

A small amount of agricultural land is found at the lower elevations within the forest boundaries. This land was for the most part homesteaded before the creation of the Forest. Almost the entire remainder is included in 326 tracts listed to settlers under the forest homestead act.

Hardly second in interest to the economic resources of the Carson National Forest are its historical and archæological monuments and its value for purposes of recreation and public health. Throughout the Amarilla and Jicarilla division of the Forest there are numerous ruins of prehistoric cliff dwellings, which will greatly interest both the tourist and the student of archæology. Among these the most famous and the only large ruin is that at Ojo Caliente, near a hot spring having medicinal qualities, just south of the Amarilla division. There is a legend among the Taos Indians that Montezuma lived here and from here led into Mexico the great migration which is supposed to have been the origin of the Aztecs. In this country the early Spanish explorers also left their marks in the form of numerous old adobe missions. Every Spanish placita, of which there are many on or near the Forest, has its picturesque old church, some

of them dating back to the days of the Spanish occupation. In addition to these monuments and ruins found within the general region, in the high mountains there are also excellent streams for fishing as well as many scenic attractions. The delightful climatic conditions will doubtless in time assure a large development of the many resources of the region. Even now many attractive parts of the Forest are comparatively inaccessible, and travelers usually content themselves with visiting the town of Taos, which has become famous for its Indian pueblo, its picturesque Indian festivals, its historic building and traditions, and for its colony of American artists.

As rapidly as funds permit, roads and trails are being built on the Carson National Forest by both the Federal and State Governments. A good road has already been completed from Taos up Taos Canyon to the top of the divide where it joins the road to Cimarron. The Red River Road from Ute Park west over the divide and down Red River to Questa, thence to Taos, has also recently been finished. These roads give access to the heart of the Taos Mountains with their unexcelled scenery and excellent camping places.

THE DATIL NATIONAL FOREST.

(In Catron, Sierra, and Socorro Counties.)

The Datil National Forest comprises 2,903,720 acres and is the largest in the United States, outside of Alaska, and is one of the richest in New Mexico in possibilities for future development. It is composed of five divisions within the Mogollon, San Francisco, Mangas, Gallo, Tulerosa, Elk, Datil, Gallinas, Magdalena, San Mateo, and Black Range mountain chains of west central New Mexico and includes a gross area of nearly 3,000,000 acres, administered with headquarters at Magdalena.

The Datil Forest is particularly valuable as a watershed, lying at the headwaters of the Gila and Little Colorado Rivers, along whose valleys there are many agricultural communities both in Arizona and New Mexico. The headwaters of these rivers are derived from the mountainous country in the western division, where there are a number of living streams. The east portion of the Forest is comparatively dry, but its importance as a watershed is greatly enhanced by the fact that it is all tributary to the Rio Grande River above the Elephant Butte Dam.

The timber resources of the Datil National Forest are enormous. However, on account of the inaccessibility of much of the Forest, the development of these resources may be said scarcely to have begun. The total stand is estimated at about 3,330,000,000 board feet of saw timber and 4,850,000 cords of wood. The saw timber is principally western yellow pine, Douglas fir, and spruce; the cordwood is piñon, juniper, and oak. The few parts of this vast body

of timber that are now accessible supply material for several small but active sawmills. These mills cut about a million feet of lumber each year, all of which is absorbed by the immediately adjacent communities. That the timber resources of the Datil National Forest can and will indefinitely sustain a great lumbering industry is hardly open to question. The development of this industry will begin immediately upon the construction of railroads into the vicinity of the forest area.

An extensive and thriving live-stock industry is supported by the forage resources of the forest. In the calendar year 1921, 357 persons had grazing privileges on the Datil. The stock under permit for that period consisted of 53,609 cattle and horses and 106,271 sheep. Under the system of scientific range management which has been inaugurated by the Forest Service in cooperation with the resident stockmen, there is every indication that this number of stock can be indefinitely supported on the grazing ranges of this Forest.

A few of the mountain valleys and open lands at the lower elevations are chiefly valuable for agriculture. Many of these lands were entered by homesteaders before the creation of the Forest and 271 additional tracts have been listed by the Forest Service to settlers desiring to make entry under the forest homestead act. These tracts include nearly all of the remaining land on the Forest that is adapted to agriculture.

The Datil National Forest is largely off the beaten path, much of its country is wild and rugged and many portions of it can be reached only on horseback. Road development, however, is being steadily pushed, and the Forest is rapidly becoming more accessible. It is used very little by tourists and others seeking recreation, although it has been for many years the favorite grounds of many residents of New Mexico for the hunting of deer and turkey. On most portions of the forest game is plentiful and camping places are beautiful. Recently 10 game refuges, with an average area of 21,000 acres, have been established by the State game commission. These refuges are well distributed over the entire Forest and will furnish protected breeding grounds from which game will overflow to the surrounding country. It is expected that this "backwoods" country can be maintained as a real sportsman's paradise.

The extensive live-stock industry which is already supported by the Datil National Forest, the beneficial effect of the conservative administration of the headwaters of its important streams, together with the certainty of a great development of its timber resources, make this Forest one of the most important in New Mexico and one whose development will be a large factor in the prosperity of the western part of the State.

THE GILA NATIONAL FOREST.

(In Catron, Grant, Hidalgo, and Sierra Counties.)

The Gila National Forest, administered from headquarters at Silver City, N. Mex., comprises an area of 1,638,053 acres in southwestern New Mexico and embraces the Mogollon, Black Range, and Pinos Altos Mountains. Not only does this area contain particularly valuable resources of timber, range, and minerals, but it is very important as a watershed. Within the Forest are the sources of the Gila and Mimbres Rivers, and a large portion of the San Francisco River watershed. Large areas of productive lands in both New Mexico and Arizona are dependent for irrigation water and agricultural prosperity upon the continuous flow of these streams. The mountain ranges within the Gila National Forest contain numerous living streams which afford excellent fishing, and, together with the natural scenic beauty of the region and the abundance of game, offer exceptional opportunities to an increasing number of sportsmen and summer visitors.

A large part of the forest area is covered with exceedingly valuable stands of timber estimated at 2,150,000,000 board feet of saw timber and 875,000 cords of wood. The saw timber is western yellow pine, Douglas fir, and Engelmann spruce, and the cordwood is largely juniper, oak, and piñon. As transportation facilities are inadequate, a considerable part of the timbered area is inaccessible. The total cut during the year ending June 30, 1921, was 2,383,000 feet of saw timber, mine props, and other forest products. The Forest supplies the raw material for four active sawmills, but the increasing development of the region will make possible a large extension of these lumbering operations without exceeding the sustained producing capacity of the Forest.

A very limited area of valley lands, confined for the most part to the lower elevations, is chiefly valuable for agriculture, and 122 tracts of this land have been listed to settlers under the forest homestead act.

Large portions of the Forest, which are extremely rough and mountainous, are now accessible only to those traveling on horseback and with pack animals. Much of this country is, therefore, little known except to a few stockmen and hunters. An excellent system of trails, which lead through some of the finest mountain scenery in the Southwest, is making a large part of this country more accessible. Persons desiring to go into this section will be able to outfit at Silver City. In 1921 the New Mexico State Game Commission established four small game refuges within the Gila National Forest, two of which—the Black Canyon and the Animas refuges—are within the Black

Range, and two—the Mogollon and White Creek refuges—are within the Mogollon Mountains. These refuges are established as safe sanctuaries in which game may breed and from which it may replenish adjacent hunting regions.

The principal industries of the Gila National Forest are mining and stock raising, the steady development of which has made the region well known as one of the most productive in the State. The forest area can safely carry about 56,055 head of cattle and horses and 19,415 head of sheep and goats. This is approximately the number now grazed on the Forest by 172 permittees; and it may be continued indefinitely without danger to the forest growth and to watershed values from overgrazing.

The mining industry, although now somewhat dormant, will undoubtedly revive with the increase in the price of copper, for this region contains a number of the best copper properties in the State. Here are found the mines of the Chino Copper Co., the Tyron mines of the Phelps Dodge interests, and the famous Mogollon gold mines, as well as many smaller ones. Most of these mines are more or less dependent upon the National Forest for mine timbers, ties, lumber, and fuel. Especially is this true of Mogollon, where, because of the brisk demand for forest products, all the surrounding National Forest lands are being managed so as to give this community a permanent timber supply.

Large parts of the Forest are now quite inaccessible and little known. With the certain future development, however, of its inaccessible timber resources, as well as a fuller appreciation of the attractions it offers to sportsmen, travelers, and summer visitors, the Gila National Forest will contribute in an increasing degree to the prosperity of southwestern New Mexico.

THE LINCOLN NATIONAL FOREST.

(In Chavez, Eddy, Lincoln, Otero, and Torrance Counties.)

In the southeastern part of the State, comprising a gross area of 1,472,079 acres in the Guadalupe, Sacramento, White, Capitan, and Gallinas Mountain ranges, lies the Lincoln National Forest. Its administrative headquarters is at Alamogordo. Surrounded by great expanses of the lower treeless plains, the high-wooded slopes of the four mountainous divisions of this Forest provide the timber and water which are of vital importance to the general development of the southern portion of the State.

Especially is this true of the east side of the White Mountain, Sacramento, and Guadalupe divisions, for they embrace the headwaters of the Rio Hondo, Rio Felix, and Rio Penasco, all feeders of the Pecos River. The Rio Hondo is the source of water supply for

the United States Reclamation Service, Hondo irrigation project, as well as for large areas of irrigated lands situated on the banks of its upper tributaries. Chief among these is the Rio Bonito, which forms the water supply for the town of Carrizozo and for a considerable mileage of the El Paso & Southwestern, and Atchison, Topeka & Santa Fe Railways, and the Rio Ruidoso, along which are many prosperous farms. Along the Rio Felix and Rio Penasco there are considerable areas of irrigated lands, although the larger part of the water from these streams reaches the Pecos River, where it is caught in the United States Reclamation Service dam and used for irrigation purposes on the important Carlsbad project. Undoubtedly this watershed also exerts an active influence on the Pecos River. Indiscriminate cutting of timber and overgrazing of the watersheds of these tributaries, which are now prevented under Forest Service administration, would surely result in serious silting of the Hondo and Carlsbad irrigation projects and this in turn would be detrimental to the development of the great agricultural region already reclaimed.

The western slope of the Sacramento and White Mountain divisions descends by two precipitous escarpments to the Tularosa plains, its drainage including several small streams which furnish water for the irrigation of the fruit and alfalfa farms which support the towns of Alamogordo, La Luz, Tularosa, High Rolls, and Mountain Park. One of these streams also supplies the town of Alamogordo with water. The importance of the conservative management of these steep slopes in order to prevent timber depletion, overgrazing, and the resultant floods is therefore self-evident.

The timber resources of this Forest are estimated to consist of 424,869,000 board feet of saw timber and 1,343,085 cords of wood. The saw timber consists largely of western yellow pine and Douglas fir and the cordwood of piñon and juniper. Of this amount there was cut about 3,173,000 feet of saw timber, ties, cordwood, and other forest products during the year ending June 30, 1921. The cut per acre is not sufficient to lessen the beneficial effect of the forest cover on the flow of the streams whose water is used for irrigation purposes.

In addition to the value of the Forest as a watershed and for timber production, its ranges were grazed in 1921 by 33,481 head of cattle and horses and 17,005 sheep and goats. Grazing privileges are widely distributed among 394 permittees, who in addition graze a large number of work and milk stock on the Forest free of charge.

Agriculture is successfully practiced along some of the narrow valleys in the Forest where most of the lands suitable for that purpose passed into private hands many years ago. Since the creation of the

Forest, most of the remaining agricultural lands have been listed to homesteaders in 351 separate tracts.

No other section of New Mexico is attracting so many summer residents as the Sacramento Mountains. This summer population centers in the resorts at Clouderoft and High Rolls which are located on the crest of the Sacramento Range and are reached by a branch line of the El Paso & Southwestern Railroad. Many people from El Paso and the hot plains of western Texas spend their summers in these mountains. With the continued development of transportation facilities, there is no doubt that the region will greatly increase in popularity and become fully utilized for the purposes of summer recreation and public health.

Good roads recently built by the Federal and State Governments into portions of the Sacramentos and into the White Mountains have opened up new areas for recreation. Among these are the beautiful Ruidoso Creek area, now reached over an excellent road from the Pecos Valley and through the Mescalero-Apache Indian Reservation, and the area at the north end of the Capitans recently chosen by the city of Roswell for a municipal camp. Further road development will soon make still other beautiful sections more accessible to El Paso and other valley communities.

THE MANZANO NATIONAL FOREST.

(In Torrance, Socorro, Sante Fe, Bernalillo, Sandoval, McKinley, and Valencia Counties.)

The Manzano National Forest has an area of 927,919 acres and comprises six divisions located on the different mountain ranges of central and western New Mexico. It is administered from headquarters at Albuquerque. The best estimates available place the total stand of timber at 346,000,000 board feet of saw timber, mostly western yellow pine, Douglas fir, white fir, and Engelmann spruce, and at 1,200,000 cords of piñon, juniper, and oak wood.

The Manzano-Sandia division is located on the mountain range of the same name which lies to the east of the city of Albuquerque. This division is topographically distinct from the remainder of the Forest by reason of an uplift which exposes the rock strata on its western slope in the form of a precipitous escarpment of about 4,000 feet, a prominent feature of the view from Albuquerque. The long eastern slope, on which most of the timber is located, follows the dip of these strata and thereby causes almost the entire precipitation of the mountain range to drain eastward into the Estancia Valley. This valley is approximately 75 miles in length and was extensively settled about 14 years ago. Severe failures of the dry farming methods in use resulted in a check in the development of the region, but it has since been demonstrated that irrigation water

may be obtained by pumping from levels 10 to 100 feet below the surface. The future prosperity of the valley would, therefore, appear to depend on a stable and adequate supply of underground water, and it is certain that most of this water is derived from the National Forest area immediately to the westward, whose careful administration accordingly assumes additional importance because of its value as a watershed.

South of this is located the Chupadera Mesa, a high plateau that grows much piñon and juniper cordwood. Most of this timber is now inaccessible, and the area was until recently very little used, since it had no living water upon it. As a result of the development of stock tanks and deep wells, however, practically all of this country is now used by cattle and sheep.

The remainder of the forest lies in the Zuni Mountains. The divisions on Mount Taylor, Mount Powell, Mount Sedgewick, and in the more level country near Fort Wingate all contain valuable stands of saw timber which because of its proximity to the Santa Fe Railroad is readily marketable. Most of the Manzano Forest's annual cut, which in the year ending June 30, 1921, was 1,366,000 feet of lumber, props, and other forest products, comes from the Zuni Mountains.

The Manzano National Forest is also an important grazing region, which in the calendar year 1921 afforded range for 10,381 head of cattle and horses and 51,090 head of sheep and goats as well as for a large additional number of cattle, horses, and goats grazed free of charge by the settlers and by Zuni and Navajo Indians. The number of permittees was 209.

The Forest is somewhat densely populated, about 3,000 people being directly dependent on its resources for their immediate livelihood and a much greater number for their fuel and timber supply. Most of those areas on the Forest which are more valuable for agriculture than for timber production were taken up under the homestead law and small holdings act before its creation into a Forest. The remaining areas within the forest which are chiefly valuable for agriculture have been largely taken up under the forest homestead law, 212 tracts having been listed to homesteaders.

The close proximity of the Manzano Forest to the most densely populated part of New Mexico explains its importance to the prosperity of the State. A number of fairly good roads running through the Forest make it readily accessible. It will probably be the first New Mexico National Forest upon which timber cutting must be restricted in order through a long period of years to maintain for local consumption an approximately even annual yield.

THE SANTA FE NATIONAL FOREST.

(In Mora, Rio Arriba, Sandoval, San Miguel, Santa Fe, and Taos Counties.)

The Santa Fe National Forest lies on either side of the valley of the Rio Grande in northern New Mexico. It embraces a gross area of 1,489,987 acres, and is administered from the forest headquarters in the historic town of Santa Fe. The Forest has two divisions—the Jemez on the west and the Pecos on the east.

The watersheds of this Forest supply important feeders to the waters of the Rio Grande and embrace the headwaters of the Pecos River. They bear a most important and beneficial relation, therefore, to the irrigated agricultural regions tributary to those two streams. Along the Rio Grande and its tributaries, particularly between the two divisions of the Forest, there are many irrigated farms dependent directly upon its watersheds for their irrigation water. The Forest contains not only the entire watershed of the Santa Fe River, which is the source of the water supply for the city of Santa Fe, but also most of the Gallinas River watershed, which is the source of the Las Vegas supply. The conservative handling of the timber and grazing resources of these watersheds is, therefore, of the utmost importance, and the forest administration is doing its best to keep these water supplies from contamination.

In addition to its value to the watersheds of the Rio Grande and the Rio Pecos, the Santa Fe National Forest has timber resources which are only beginning to be developed, and which will later be an important factor in the timber supply of the Southwest. The total stand is estimated to be about 2,672,037,000 board feet of saw timber and 1,486,638 cords of wood. Of this 5,712,000 feet were cut during the year ending June 30, 1921. Large bodies of this timber will sustain a very much greater annual cut as soon as they can be made accessible by means of the extensive railroad construction which will be necessary to reach them. The Forest now supplies material for 11 active mills. Excellent opportunities are offered, especially by the timber on the Jemez division, to prospective purchasers who are prepared to undertake large and extensive operations.

The grazing resources also of this Forest are of very considerable importance. Permits were issued for the season of 1921 for a total of 9,683 head of cattle and horses and 78,422 head of sheep and goats. Most of these animals are owned by settlers of the adjoining valleys. For the calendar year 1921 there were 624 permittees. There is now a little excess range on the Jemez division which would be available for settlers. The forage on this range is largely mountain bunch grass, which is best adapted for the summer grazing of cattle and horses. There is very little winter range on the forest, and persons

who wish to enter the stock business there would have to feed or look for winter range in the lower country outside the Forest.

Important as are the economic resources and watershed value of the Santa Fe National Forest, it is more widely known for its cliff dwellings and other ancient ruins and because of its popularity as a summer resort. The archæological interest of the region centers largely in the cliff dwellings and community houses of the Jemez division, but its best known historical monuments are found in the ancient city of Santa Fe, which was once the capital of the Spanish Province of New Mexico and famous in American history as the terminal of the Santa Fe Trail.

On the Jemez division three areas, containing in all 22,075 acres, have been set aside as the Bandelier National Monument because of the large number of important cliff dwellings and other ruins found there. These areas contain probably the most extensive and most important archæological ruins in the whole United States, and because of the ease with which they can be reached by automobile they are becoming more popular each year. Best known and largest among these are the ruins in the Rito de los Frijoles, 35 miles over a fair mountain road from Santa Fe. The Otowi and Tsankawi ruins attract many visitors, as do also the painted caves and stone lions. The two latter, however, can be reached only by horseback trails from the Rito de los Frijoles, where there is a small hotel for the accommodation of those who wish to extend their archæological explorations over more than one day.

The principal development of the recreational resources of the forest has taken place on the headwaters of the Pecos River on the Pecos division, a region of unsurpassed mountain scenery. Here are found several hotels for the accommodation of tourists and the excellent fishing and the delightful summer climate and scenery are attracting a growing colony of summer cottagers. An excellent road leads into the upper Pecos River region, and already numerous cottages have been built under Forest Service permits, and additional ones are being built each year. Several communities from eastern New Mexico and the panhandle of Texas are finding the upper Pecos a desirable place for the development of municipal camp grounds. There is a growing appreciation of the advantages offered by the National Forests to travelers, sportsmen, and seekers after health, and this region is rapidly developing as a playground.

The Pecos and Jemez country is the oldest settled region in the United States, and most of the limited areas within the Forest which are chiefly valuable for agriculture were appropriated long before the creation of the Forest. Almost the entire remainder has been listed to settlers in 368 tracts under the forest homestead act.

THE CORONADO NATIONAL FOREST.

(New Mexico divisions in Hidalgo County.)

The Coronado National Forest lies largely in the State of Arizona and its administrative headquarters is at Tucson. Two divisions, however, those in the Animas and Philoncillo Mountains, which comprise an area of 129,152 acres, are in the extreme southwest corner of New Mexico. These areas contain a stand of 190,000 cords of piñon, juniper, and oak cordwood, but there is practically no saw timber, the few straggling pines not being sufficient in number to make logging operations feasible. The divisions are exceptionally rough and mountainous, and, in addition to the value of their timber to the large surrounding treeless areas, the protection of their watersheds is a vital factor in the maintenance of the underground water on which the great agricultural valleys of Playas, Animas, and San Simon are becoming increasingly dependent.

A good deal of cordwood is cut from these two divisions for consumption in the valleys surrounding them. Most of the dead-and-down cordwood has already been taken and future cuttings will have to be confined entirely to green material. These divisions are used also for the grazing of 4,430 head of cattle and horses, most of which belong to settlers in the adjoining open valleys, the number of permittees being 19.



